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Composition for the preparation of a thermoset having thermochromic properties

Patent claims

1. Composition for the preparation of a thermoset having thermochromic properties, consisting of a mixture of a thermochromic composite, which has at least one of each of the following components:

- colorant,
- developer,
- flux,
- surface-active substance,
- polymer,

and starting components for the production of the thermoset.

2. Composition according to claim 1,
characterised in that
the thermochromic composite has been rendered substantially inert in the mixture with respect to the starting components for the production of the thermoset.

3. Composition according to claim 2,
characterised in that
for inertisation the composite is surrounded by a protective shield which consists of a surface-active substance and/or a polymer and/or a mixture of surface-active substance and polymer, especially a micelle.

4. Composition according to any one of the preceding claims,
characterised in that
the surface-active substance is present in the mixture in a concentration which reaches or exceeds the critical micelle concentration.

5. Composition according to any one of the preceding claims, characterised in that the components of the composition are selected from one or more of the substances mentioned in the table below:

Colorant	phthalides, fluorones, spiropyrans
Developer	phenols, organic acids and derivatives thereof
Flux	paraffins, saturated and unsaturated alcohols, acids, esters, amides, amines
Surface-active substance	ionic and non-ionic surfactants, dioctyl sulfosuccinate, C-12 sulfobetaine, C-16 amine oxide, Na dodecyl sulfate, cetyltrimethylammonium bromide
Starting components for the production of the thermoset	polyesters, formaldehyde resins, epoxy resins, polyurethanes, hydroxycarboxylic acids, dialcohols, diepoxides, diisocyanates, diamines, vinyl monomers, diene adducts of maleic acid, phthalic acid derivatives
Polymer	PVA, polyacrylic acid, polyether, polyester, styrene, polyacrylamide, polyethylene, polypropylene, maleic anhydride copolymers, melamine

6. Composition according to any one of the preceding claims, characterised in that the components of the composition are present in a concentration in accordance with the table below:

Component	% by weight	preferred % by weight	especially preferred % by weight
Colorant	0.005-0.8	0.01-0.5	0.1-0.25
Developer	0.005-1.6	0.01-1.0	0.1-0.5
Flux	0.5-6.5	0.1-6.0	1.0-3.0
Surface-active substance	0.008-2.3	0.01-2.0	0.2-0.6
Starting components for the production of the thermoset	87.5-99.9	90.0-99.5	95.0-98.5
Polymer	0.05-7.3	0.11-6.1	0.5-3.0

7. Composition according to any one of the preceding claims, characterised in that
the thermochromic composite enables a thermoset to be prepared which exhibits at least one clearly defined colour change in dependence upon the temperature.

8. Composition according to any one of the preceding claims, characterised in that
the thermochromic composite enables a thermoset to be prepared in which, in dependence upon the temperature, a marked colour change, especially a reversible colour change, takes place especially within a temperature range of 15 K, preferably within a temperature range of 8 K and more especially within a temperature range of 2 K.

9. Composition according to any one of the preceding claims, characterised in that
the thermochromic composite enables a thermoset to be prepared which has multiple colour change transition points.

10. Composition according to any one of the preceding claims, characterised in that
an isotropic thermoset can be produced.

11. Composition according to any one of the preceding claims, characterised in that
at least one colour change is irreversible.

12. Composition according to any one of the preceding claims, characterised in that
at least two of the components of the thermochromic composite are present functionally within a supramolecular molecule structure.

13. Use of a composition according to any one of claims 1 to 12 in the production of housings, especially of bearings or pumps, scrapers, covers, especially for machines, monitoring and display devices and for visible temperature monitoring, especially in adhesives technology and quality assurance.